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BUILDING DEPARTMENT

CITY OF BOSTON

JAMES H. MOONEY
COMMISSIONER



ANNUAL REPORT

1942

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ANNUAL REPORT
OF THE
BUILDING DEPARTMENT
FOR THE
YEAR ENDING DECEMBER 31, 1942



CITY OF BOSTON
PRINTING DEPARTMENT
1943



ANNUAL REPORT
OF THE
BUILDING DEPARTMENT
FOR THE YEAR 1942.

Boston, May 15, 1943.

HON. MAURICE J. TOBIN,
Mayor of the City of Boston.

SIR,— As required by the provisions of section 1, chapter 550, Acts of 1907, and section 24, chapter 3, Revised Ordinances of 1925, I submit herewith a statement concerning the activities and accomplishments of the Building Department during the year 1942, and list a few of the highlights pertaining to same which I am certain would be of interest to you and to the public.

JAMES H. MOONEY,
Building Commissioner.

THE BUILDING DEPARTMENT.

Organized October 2, 1871, to provide for the regulation and inspection of buildings, the more effective prevention of fire, and the better preservation of life and property. The department immediately became a vital force in providing public safety to the citizens of Boston.

DIVISIONS OF DEPARTMENT.

Annexed is a brief description of each division of the Building Department and also tables which by figures and statistics indicate the work performed during the year just passed.

ADMINISTRATIVE DIVISION.

Requirements of building law as they pertain to the establishment and recording of permits, licenses, documents, plans, surveys, reports, etc., naturally involve a considerable amount of clerical work. The functioning of the various divisions composing the Building Department is largely dependent upon the efficiency of the clerical personnel. Their constant interest in the preparation and circulation of documents, drawings, forms and orders, is such that their services are invaluable.

CONSTRUCTION DIVISION.

Operates almost entirely in the field and is charged with the inspection of all buildings, except Federal and County buildings. The area of the city has been divided into districts and the Building Inspector in each district examines the materials and methods of construction now used in modern building and enforces, to the best of his ability, the requirements of statute law designed for the protection of life, limb and property. The statistics for the year 1942 are as follows:

INSPECTIONS AND REPORTS.

New buildings	.	.	.	.	.	.	.	.	2,941
Alterations	.	.	.	.	.	.	.	.	15,229
Existing buildings	.	.	.	.	.	.	.	.	3,138
Boilers	.	.	.	.	.	.	.	.	67
Building accidents	.	.	.	.	.	.	.	.	6
Fires	.	.	.	.	.	.	.	.	720
									<hr/>
									22,101
									<hr/>

EGRESS DIVISION.

Broadly speaking, the work of the Egress Division consists of the application of the rule of common sense to the problem of providing adequate means for removing persons expeditiously from buildings or structures in case of emergency and of seeing that adequate egress is maintained. Included in the duties of this division is the inspection of theatres, moving picture houses, halls of public assembly, hospitals, lodging houses, fraternity houses, homes for the aged, hotels, etc.

This division also makes night inspections wherever large audiences are anticipated for the purpose of keeping available to the public unobstructed means of egress and fire protection.

Examinations made during 1942:

Classification.	Total.
Theatres	1,423
Movies	657
Public halls	644
Homes for aged persons	47
Homes for infants	8
Hospitals	10
Hotels	120
Apartment houses	63
Lodging houses	488
Dwellings	22
Dormitories	5
Nurses' homes	4
Convents	1
Churches	3
Schools	55
Clubs	1
Restaurants	25
Office buildings	4
Factories	12
Mercantile buildings	39
Garages	1
Fence viewings	10
Law Department titles	498
In Court	51
Fire escapes	222
Complaints investigated	43
Consultations	1,296
Plans examined	460
Total	<hr/> 6,212
Letters sent	2,376
Letter received	400
Police letters	1,017
Night and holiday inspections	309

PLAN DIVISION.

Existing building law requires the submission of drawings indicating by architectural, engineering and mechanical design the type and class of construction, the occupancy, the materials which compose the struc-

ture proper, the dimensions designing areas, sizes of rooms and heights of building, width of stair halls and other egresses, percentages of area of lot occupied by the building, mechanical installations, locations of and sizes of exterior fire escapes, balconies, etc.

Drawings are examined and approved or disapproved by the Zoning, Egress sand Plan Divisions, also the Plumbing, Gasfitting, Elevator and Sprinkler Divisions, and the Health Department and Park Department when the administration of regulations of these departments are applicable.

The citizens of the city have been so long accustomed to the results of the work of its Building Department that they take these results for granted. The houses in which they live; the offices, factories or stores in which they work; the theatres, moving picture houses, halls and places of public assembly in which they spend their hours of recreation; the schools and hospitals; the churches in which they worship — all are structures, the design and construction of which have been carefully checked and supervised.

Plans examined as follows:

	First Class.	Second Class.	Third Class.	Alterations.	Amendments.	Specials.	Total.
Approved.....	10	35	235	1,181	86	96	1,643
Not approved.....	1	3	44	256	17	18	339
Totals.....	11	38	279	1,437	103	114	1,982

Immediate action permits issued at counter	2,430
Applications refused where appellant referred to	
Board of Appeal	175
Pending last year	10
	185

N. B.— Of which 132 were granted, 16 were dismissed, 7 were abandoned, 1 was withdrawn, and 29 are pending.

ZONING DIVISION.

Analogous to the work of the Plan Division, which is wholly administered by the office personnel, is the work of the Zoning Division which varies from that of

the Plan Division in that drawings are analyzed and approved as being in compliance with the Zoning Law, a separate act of the Legislature, whereas the Plan Division analyze and approve the drawings as being in compliance with Building Law.

The Zoning Regulations as enacted is an act regulating and restricting the use of buildings and premises, the height and bulk of buildings, and the occupancy of lots in the City of Boston and for said purposes dividing the city into districts.

The following table summarizes the work of 1942:

Number of applications received for new buildings and alterations and zoned according to districts:		
Approved	1,382	
Not approved	437	
	<hr/>	1,819
Number of applications forwarded from Board of Street Commissioners for garage and gasoline licenses to be zoned before action taken by that Board:		
Approved	418	
Not approved	0	
	<hr/>	418
Applications for signs from State House:		
Approved	86	
Not approved	4	
	<hr/>	90
Applications from Police and Licensing Boards for new licenses and renewals:		
Approved	847	
Not approved	0	
	<hr/>	847
Total		<u><u>3,174</u></u>
Applications refused where appellant referred to Board of Appeal		80
Pending last year		20
	<hr/>	100
	<hr/>	

N. B.—Of which 54 were granted, 18 were dismissed, 4 were withdrawn, 16 were abandoned, and 8 are pending.

PLUMBING DIVISION.

The art of plumbing means the incorporation into a structure of such pipes, fixtures and other apparatus

and appurtenances as are necessary to bring in the water supply and remove liquids and water-carried wastes. As public health is vitally dependent on properly designed and constructed supply and waste systems, the importance of the Plumbing Division and its inspection force can be readily realized.

PLUMBING INSPECTIONS AND TESTS.

Plumbing, new	1,198
Plumbing, alterations	8,569
Plumbing, tests	955
Total	<u>10,722</u>

SPRINKLER DIVISION.

In the year 1914, laws were enacted requiring sprinkler and standpipe equipment in certain buildings other than theatres and a large number of such installations have been made.

As is well known, a fire may occur in a first-class building or in a wooden shed and it is to be regretted that the use of automatic fire protection is not more general, especially as such installation brings about monetary reward in reduced insurance, aside from protection of life and property. The ultimate in automatic protection is reached when the system is so installed that the devices are influenced by heat in the shortest space of time and when the fire causing that heat is extinguished with the least amount of water.

FIRE RECORD.

Number of fires in sprinklered buildings	201
Number controlled before sprinklers operated	66
Number controlled by one sprinkler	80
Number controlled by two sprinklers	34
Number controlled by more than two sprinklers,	21

EXAMINATIONS AND REPORTS.

Sprinkler installations	1,371
Standpipe installations	84
Tests of both	1,310
Total	<u>2,765</u>

Statement of Building Operations in the City of Boston for the Five Calendar Years Ending December 31, 1942.

	1942.		1941.		1940.		1939.		1938.	
	Num- ber.	Cost.	Num- ber.	Cost.	Num- ber.	Cost.	Num- ber.	Cost.	Num- ber.	Cost.
First class.....	57	\$5,614,690	59	\$4,307,229	46	\$3,839,788	136	\$10,487,777	24	\$3,807,000
Second class.....	38	297,475	133	1,596,645	131	1,274,482	118	1,570,100	126	1,164,560
Third class.....	249	884,090	512	1,756,575	480	1,713,211	267	1,052,041	285	1,193,650
Special class.....	57	423,695	84	414,485	98	179,046	81	193,470	88	102,799
Total new construction.....	401	\$7,219,950	788	\$8,074,934	755	\$7,006,527	602	\$13,303,388	522	\$6,268,009
Alterations, repairs, etc.....	3,135	2,621,944	3,954	4,004,388	4,205	4,087,981	4,665	3,905,994	4,854	5,125,871
Total structural construction.....	3,536	\$9,841,894	4,742	\$12,079,322	4,960	\$11,094,508	5,165	\$17,209,382	5,376	\$11,383,880
Plumbing.....	1,939	\$618,466	3,280	\$1,712,465	3,241	\$1,334,513	3,317	\$2,125,668	3,138	\$1,222,194
Gasfitting.....	3,959	639,454	6,507	1,041,508	5,467	1,224,033	5,317	608,222	5,580	565,462
Heaters, ovens, engines, etc.....	244	100,653	485	326,266	392	281,282	284	278,141	367	413,654
Elevators, new freight.....	28	62,510	41	59,775	45	69,405	51	81,913	46	82,326
Elevators, new passenger.....	14	273,200	24	208,389	22	244,103	20	141,537	41	494,157
Elevators, alterations, freight.....	161	53,228	200	37,906	256	57,170	236	37,728	32	41,958
Elevators, alterations, passenger.....	299	69,712	359	129,175	434	114,059	467	97,716	18	61,490
Signs, projections, etc.....	177	23,736	430	92,966	611	149,241	485	100,816	611	149,268
Fire escapes.....	51	10,085	67	16,209	70	11,304	74	15,881	91	18,797
Take-downs, wood.....	510	138,859	605	144,902	357	80,214	1,079	171,185	232	39,499
Take-downs, brick, etc.....	98	38,509	459	169,862	185	81,545	314	135,777	98	23,958
Sprinklers.....	52	51,290	71	93,275	46	67,110	48	57,972	66	90,259
Excavations.....	2	300	7	5,900	10	6,845	11	35,800	11	11,250
Use of premises.....	15	—	50	—	65	—	56	—	42	—
Totals.....	7,549	\$2,080,002	12,585	\$4,038,598	11,201	\$3,720,824	11,799	\$3,888,356	10,373	\$3,214,188
Grand total all work.....	11,085	\$11,921,896	17,327	\$16,117,920	16,161	\$14,815,332	16,924	\$21,097,738	15,749	\$14,608,068
Department revenue.....	.....	\$34,409 50	.....	\$50,106 85	.....	\$49,072 15	.....	\$46,740 90	.....	\$27,265 20

ELEVATOR DIVISION.

Undoubtedly every person inhabiting or frequenting the multi-storied buildings in our city realizes the convenience provided them by the installation of elevators and dumb-waiters. However, very few are aware of the fact that each installation is made under the scrutinizing eye of the Building Department, through the agency of the Elevator Inspection Division.

There are in use within the city limits 6,303 passenger and freight elevators and escalators, and 2,087 dumb-waiters. In addition to the inspection of installation and maintenance of all elevators, these inspectors give an exacting and practical operation test to each passenger car operator.

ELEVATOR INSPECTIONS AND TESTS, 1942.

Inspections made	8,409
Complaints made	2,481
Complaints closed	2,243
Applications closed	1,987
New installations	60
Passenger elevators	12
Freight elevators	15
Escalators	2
Inclinators	0
Dumb-waiters	31
Alterations and repairs	802
Elevators shut down	13
Tests made	3,392
Approved	3,308
Failed — passenger	11
freight	19
Night tests	54
Accidents	69
Passenger	23
Freight	46
Fatal	10
Non-fatal	59
	<hr/>
	19,456
Applicants tested for elevator operators' licenses	1,242
	<hr/>
	<u>20,698</u>

ELEVATOR OPERATORS' LICENSES ISSUED.

New	3,188
Renewals	3,918
	<hr/>
	<u>7,106</u>

GASFITTING DIVISION.

The Gasfitting Division inspects the installation of gasfitting and gas appliances, particularly as to proper combustion and the elimination of gases and fumes through proper types of flues; also as to the locations of appliances in the room and its enclosure, and insist upon having a proper supply of air maintained to prevent the accumulation of carbon monoxide gas.

Accidental fatalities due to illuminating gas installations have, by rigid inspection and administration of law, been reduced from 82 in 1918 to 1 in 1942.

For some unaccountable reason, probably due to prohibiting the use of flexible connections and such in connection with gas installations, suicides have also been reduced from a maximum of 43 in 1917 to 11 in 1942.

GASFITTING INSPECTIONS AND TESTS.

Gasfitting, new	2,551
Gasfitting, alterations	10,088
Gasfitting, tests	4,506
Total	<u>17,145</u>

GASFITTERS' LICENSES.

Master, new	19
Master, renewals	435
Journeymen, new	26
Journeymen, renewals	495
Total	<u>975</u>
Fees	<u>\$772.50</u>

SUMMARY OF EXAMINATIONS AND REPORTS, 1942.

New buildings	2,941
Alterations	15,229
Existing buildings	3,138
Boilers, engines, etc.	67
Plumbing, new	1,198
Plumbing, alterations	8,569
Plumbing, tests	955
Gasfitting, new	2,551
Gasfitting, alterations	10,088
Gasfitting, tests	4,506
Egress	6,212
Elevators	20,698
Sprinklers	1,371
Standpipes	84
Tests of both	1,310
Zoning	3,174
Plans and applications	2,430
Fires	720
Concrete and piling	156
Gas asphyxiations	1
Building accidents	6
Complaints made	486
Specials	140
Finals	3,504
Communications acted on	1,781
Special detail	765
	<hr/>
	92,080

Violations referred to Law Department for prosecution — 37

Examinations for Sewer Division — 25 hours.

Snow removal — 13 hours.

One inspector serving on Draft Board.

Welding examinations — 8 hours.

34 inspectors on Oil Survey for Fire Department — 2,227 examinations.

Survey of buildings — 277 examinations.

Examination of boilers in City Yard buildings.

Examination of buildings on Boylston street near Arlington — flooded by break in water main.

November 16 — Bad fire in East Boston, 12-14-16 Maverick square.

November 28 — Fire at 12 Piedmont street.

December 15 — Fire at Washington and West streets.

Blackout tests — February 17, March 31, July 16, August 13, September 8 and 23, and air raid tests — November 10, December 15, 1942.

Schools attended by Supervisors and Inspectors of this Department in the interest of the war effort.

Bomb Reconnaissance School at Camp Devens.

Bomb Reconnaissance School at Northeastern University.

Aerial Bombardment Protection School at Massachusetts Institute of Technology.

Fire Protection Engineering Course at M. I. T.

Chemical Warfare School at Boston Latin School by United States Army.

War courses at Amherst College.

FINANCIAL REPORT, 1942.

A. PERSONAL SERVICE:	
1. Permanent employees	\$162,848 91
2. Temporary employees	311 50
B. SERVICE OTHER THAN PERSONAL:	
1. Printing and binding	63 65
4. Transportation of persons	2,344 24
12. Bond and insurance premiums	12 50
14. Motor vehicle repairs and care	86 40
35. Fees, service of venires, etc.	38 75
37. Photographic and blueprinting	82 10
39. General plant	110 30
42. Miscellaneous	4,756 26
C. EQUIPMENT:	
4. Motor vehicle	—
9. Office	—
10. Library	17 20
13. Tools and instruments	—
15. Tires, tubes and accessories	8 27
16. Wearing apparel	—
17. Miscellaneous	8 36
D. SUPPLIES:	
1. Office	1,639 26
11. Motor vehicle	148 61
16. Miscellaneous	—
E. MATERIALS:	
10. Electrical	7 26
13. Miscellaneous	1 79
F. SPECIAL ITEMS:	
7. Pensions and annuities	1,350 00
H. W. P. A.	112 93
Grand total	
	<u>\$173,948 29</u>
Appropriation	
	<u>\$175,381 86</u>
Income	
	<u>\$34,409 50</u>
I. Civilian Precautionary Assistance	
1941 — Unliquidated Reserve	\$122 64
	581 87

On January 1, 1942, there were (estimated) in the City of Boston

Brick and other fire resisting buildings	44,935	
Erected during 1942	149	
	<hr/>	
	45,084	
Taken down during 1942	98	
Destroyed by fire	0	
	<hr/>	
	98	44,986
Wooden buildings	93,184	
Erected during 1942	252	
	<hr/>	
	93,436	
Taken down during 1942	510	
Destroyed by fire	1	
	<hr/>	
	511	
	<hr/>	
		92,925
Total number of buildings (estimated) in Boston January 1, 1943		<u>137,911</u>

ITEMS OF INTEREST.

Tallest buildings:

Custom House, 495 feet.

United Shoe Machinery Building, 290 feet.

New England Mutual Life Insurance Company Building,
tower 280 feet.

Ames Building, 196 feet.

Sears-Roebuck Building, 192 feet.

Tower Building, 245 feet.

Post Office Building, 345 feet.

Court House, 330 feet.

Massachusetts General Hospital Surgical Building, 188
feet.

Covering greatest ground area:

South Station, 1,467,522 square feet.

Smallest mercantile building:

212 State street, $2\frac{1}{2}$ stories high, 4 feet 9 inches front, 50
feet deep, ground area, $237\frac{1}{2}$ square feet.

Costliest building:

Storehouse, Army Supply Base, South Boston.

Oldest building:

Paul Revere House, 1660.

Largest garage under a single roof in the world, Motor Mart.

BOARD OF APPEAL.

The Board of Appeal established in accordance with sections 6 and 7, of chapter 550, Acts of 1907 as amended, in its functioning, may vary the provisions of the Act referred to in specific cases which appear to them not to have been contemplated by this Act although covered by it, or in cases where manifest injustice is done, provided that the decision of the Board in such a case shall be unanimous and shall not conflict with the spirit of any provision of the Act.

Many of the appeals were in regard to technical questions as to the meaning of the law; many cases were those not contemplated by the Act although covered by it.

In every instance where the Board granted relief — about 50 per cent of which were with modifications — the Board was unanimously of the opinion that the varying of the provisions of the Act did not conflict with the spirit of any provision of same, and that it was a specific case wherein it was a manifest injustice to refuse the appellant a permit.

The Board of Appeal acts, not only on the Building Law, but also hears appeals under the Zoning Law, — section 19, chapter 488, Acts of 1924. Boston was many years old before the adoption of the Zoning Act, and because of technical violations of uses permitted in various zones, and problems arising in the advantageous development of vacant land in the City of Boston, proponents of business enterprises would have established their plans of industry in other cities where the zoning regulations are not so restrictive had not the Board varied the application of the Zoning Act in specific cases. In every instance where a variation was permitted, the Board was convinced unanimously that a strict enforcement of the Act involved practical difficulty and unnecessary hardship, and that desirable relief was granted without substantially derogating from the intent and purpose of the Act.

The following is a statistical summary of the work of this Board for the year 1942:

In re Building Law — chapter 550, Acts of 1907, as amended:

Appeals received	159
Appeals acted upon pending from 1940	2
Appeals pending	4
Appeals withdrawn	3
Appeals sustained	64
Appeals sustained with proviso	70
Appeals dismissed	16

In re Zoning Law — chapter 488, Acts of 1924, as amended:

Appeals received	70
Appeals acted upon pending from 1940	1
Appeals pending	3
Appeals withdrawn	1
Appeals sustained	19
Appeals sustained with proviso	31
Appeals dismissed	15

BOARD OF EXAMINERS.

Established in the Building Department is the Board of Examiners, consisting of three members, who hold examinations, under reasonable rules and regulations, of persons desiring to be registered as qualified to have charge and control of the construction, alteration, removal or tearing down of buildings or structures.

The method of examination of new applicants continued as in the past, the Board making special efforts to aid men, yet enforcing rigidly the prevention-of-accident purpose of the law. Superintendents in charge of Federal projects made up a large number of this newer group.

The following is a summary of applications acted upon:

REPORT FOR 1942.

	Ap- proved.	Refused.	Fees.
New licenses and reissues.....	307	57	\$1,535 00
Renewals.....	1,882	0	3,764 00
Special licenses.....	428	91	428 00
Total.....			\$5,727 00

COOPERATION OF PUBLIC WORKS, UTILITIES AND COMMUNICATIONS OF CIVILIAN DEFENSE CORPS WITH INDUSTRIAL PLANTS.

PAPER PRESENTED AT WAR DEPARTMENT CIVILIAN PROTECTION SCHOOL, AMHERST COLLEGE, AMHERST, MASSACHUSETTS, ON SEPTEMBER 29, 1942.

By JAMES H. MOONEY,

Building Commissioner, Boston, Massachusetts.

Deputy Controller, City of Boston Committee on Public Safety,
and

Chairman of Section on Demolition and Rescue Work, Planning
and Technical Division, Massachusetts Committee on
Public Safety.

GENTLEMEN,— I have not had the pleasure of listening to the previous speakers or instructors during this course, nor will I be able to remain to hear those who will follow me, so that anything I say must be construed to be my personal opinion only. What I say I certainly hope will not conflict with or be contrary to the thoughts of others to the extent that the ultimate aims of the Civilian Protection School will be disrupted.

Civilian protection is a relatively new subject, born of this frightful war in which we are participating, and during its short span of life its course has been changed many times by differences of opinion. However, I am certain that some good can be gained by an analysis of varying thoughts, if there be such.

You gentlemen are specialists in your own respective professions of plant management and engineering, and this course which you are attending was not designed to give you further instruction in your business. There is common reason for us all to be here, and that is to learn how to protect ourselves and our fellow man from the work and actions of our enemies.

We all recognize the fact that a state of readiness in case of hostile attack, preparedness if you wish to call it such, is an absolute necessity, and we are endeavoring

to institute workable programs that will attain perfection. We cannot be perfect but we will be as near perfect as we can, and by clear thought and action outwit our enemy and reduce to the minimum the moral and physical destruction he will endeavor to inflict upon us.

About two years ago, municipal departments of the City of Boston, under the direction of Mayor Maurice J. Tobin, started the work of organizing civilians for the purpose of defense, such as rescue and demolition squads, auxiliary firefighters, and policemen, same to augment the regularly employed personnel of the various municipal departments. This work started prior to the coining of the descriptive title, "Civilian Defense," and ultimately all units were enrolled in a huge Civilian Defense organization which is national in scope, and affects, in some way or another, every man, woman and child throughout the length and breadth of our country. As your plant lies within the environs of some municipality you are vitally interested in the municipal government organizations of Civilian Defense.

Mayor LaGuardia, appointed by President Roosevelt as the first director of National Civilian Defense, has been quoted many times as saying that the City of Boston led all large cities in defense efforts, so with your permission I will use the City of Boston organization as an example of municipal defense departments upon which we all are in whole or in part dependent.

Principal departments of said organization in which you might be interested, and in some cases look to for protection, are the Public Works Department, composed of Highway, Sewer, Sanitary, Water, Street Lighting, Bridge and Ferry Divisions, etc.

Building Department, composed of construction, engineering and plan, plumbing, illuminating gas, elevator, egress and fire protection divisions.

Fire Department, composed of regular and auxiliary fire-fighting forces and a fire prevention bureau.

Police Department, composed of regular and auxiliary patrolmen and identification and communication divisions.

Health Department, composed of divisions controlling the inspection of foodstuffs, sanitation, public health, clinics, etc.

Associated with the above-mentioned municipal departments in the Civilian Defense organization are the following utilities:

New England Telephone and Telegraph Company.
Railroad Transportation Companies: Boston Elevated Railway; Boston & Albany Railroad; Boston & Maine Railroad; New York, New Haven & Hartford Railroad.
Boston Edison Company.
Boston Consolidated Gas Company.
General Alarm Corporation.
Protective Fire Department.
Western Union Telegraph Company.
Postal Telegraph Company.

I believe you recognize the fact that you need the cooperation of these defense agencies, and I am certain that they need your cooperation.

Let us see, for example, why you are dependent on these agencies and why you need and should demand their cooperation.

WATER DIVISION.

Take the Water Division of the Public Works Department. The location of your plant, as before stated, is within the corporate limits of some municipality and is serviced by the water mains of the city or town either directly or as an auxiliary service. Said mains may be so damaged by bombs that water supply to your plant may be discontinued for a considerable period of time, and the breaking of a main may be the cause of flooding your boiler or engine room or working spaces in your plant. Only the shut-off and repair crews of the water division can help you. They are equipped to do so and are constantly on the job, twenty-four hours of each day, awaiting periods of emergency both in peace and in war times.

This division is prepared to and could, by the aid of hose line, furnish temporary water supply pending the repair of breaks in the system so that production could continue uninterrupted.

I presume that most municipal water systems are similar to that in existence in Boston, divided into three separate and distinct services, all under mechanical pressure maintained by the almost continuous operation of pumping equipment. Low service, of an average

pressure of 55 pounds per square inch, is used for domestic water supply, and high service of a pressure varying from 80 to 90 pounds per square inch is used principally for fire protection in buildings by the installation of standpipe and sprinkler systems. In addition to these commonly used systems, there is what is known as a high pressure system which is under constant pressure of 50 pounds and so arranged that immediately upon the sounding of the first alarm of fire it is stepped up to 150 pounds pressure where it is maintained until an increase is requested by the Fire Department, when it can be stepped up to a maximum of 300 pounds per square inch.

The number of industrial plants that can operate without water for processing, sanitation, or fire protection is the answer as to whether or not you are dependent on and need the cooperation of the municipal water department as it is established under the Civilian Defense program.

As is the supply of water an indispensable necessity, likewise is the disposal of water through the agency of sewer thoroughfares of various types of construction and materials. The flow of sewage must not be interrupted for any considerable period of time as the health and well-being of residents of a community are dependent greatly on proper disposal of sewage. Pumps must be kept in continuous operation and all screening apparatus, gates, etc., kept in working condition.

In the Civilian Defense organization, of which I speak, there are now thirty-six (36) regularly employed water shut-off and repair crews stationed at strategic locations throughout the city, each equipped with emergency repair tools and apparatus. Likewise there are at least twelve (12) sewer repair crews always available. Approximately eleven hundred (1,100) employees work in the field forces of the Sewer and Water Divisions, and for Civilian Defense purposes regular employees of refuse collection contractors and water and sewer construction contractors have been made available as auxiliary forces.

HIGHWAY DIVISION.

Let us for a moment consider the importance of the Highway Division of the Public Works Department as it relates to the operations of your industrial plants.

We know that the finished products of manufacture are dependent on the delivery of material to your plant, and although much of it may be transported by rail or water, we still depend on highways to accommodate conveyances for our employees.

Now visualize the damage caused by a bombing raid. Can you see complete and partially-demolished buildings and unscathed streets? Of course you cannot. To believe that a city can be bombed without damaging its highways is ridiculous; consequently we have included in our Civilian Defense organization the municipal street and highway divisions. This organization of regularly employed city workmen, augmented by volunteers normally employed by road construction contractors, constitutes a very large group of men who will be available in emergency to refill and resurface highways destroyed by bombs. They are willing and ready to cooperate and you should avail yourselves of their services as necessary.

In addition to the Public Works Department, which I have mentioned, we have in our Civilian Defense organization the street lighting division, traffic tunnels, Paving, Sanitary, Bridge and Ferry Divisions, etc., each and every one of which is prepared to respond to an emergency call relating to its particular function.

BUILDING DEPARTMENT.

Closely associated with the Public Works Department, however operated as a separate organization, is the Building Department composed of the divisions previously named. With few exceptions, employees of the Building Department are technically educated men, engineers and inspectors, who devote their entire time to non-manual engineering and inspection work of a supervisory character.

As technicians, schooled in the work of Civilian Defense by attendance in the aerial bombardment and bomb reconnaissance courses conducted by Massachusetts Institute of Technology, Harvard University, Northeastern University and the First Service Command of the United States Army, they form the nucleus of an especially trained group that could well be termed a Public Safety Corps capable of acting in an advisory capacity.

Engineers and inspectors of the Egress Division in their normal functions visit all places of public assembly, such as theatres, moving picture houses, amusement centres, arenas and stadiums, as well as hospitals, public and private schools, lodging houses, homes for aged persons, industrial plants, factories, department stores, etc., and regulate the inward and outward flow of traffic by requiring door openings of sufficient width, as related to the floor areas, to accommodate the persons who might assemble. They also see that doors swing in the direction of the line of travel to permit direct and unobstructed egress.

No established rule will suffice to solve all problems of egress as the architectural plan and structural design of each building will so vary that the location of exits and paths of travel to same will be common only to a specific design. Generally speaking though, the number of persons to be served by an exit can be computed from floor areas, assuming the number of occupants, as follows:

1. One person for every six square feet in auditoriums, assembly halls, dance halls, gymnasiums, armories, lodge rooms.
2. One person for every fifteen square feet in court rooms, restaurants, class rooms in schools.
3. One person for every twenty-five square feet in retail stores, lodging houses, reading rooms.
4. One person for every thirty-five square feet in factories and work rooms.
5. One person for every fifty square feet in offices and show rooms.
6. One person for every one hundred square feet in hotels, apartments and other dwellings, police and fire stations.
7. One person for every two hundred square feet in automobile repair shops and service rooms, museums, libraries, wholesale stores and club houses, except in assembly halls thereof.
8. One person for every thousand square feet in storage garages and warehouses.

Related to the floor areas are the widths of corridors, door openings and other paths of egress, none of which should be less than thirty-six inches (36") in clear unobstructed width as accommodation for three hundred persons, with at least twelve inches (12") additional

width for each one hundred persons served over and above the provisions provided by the initial width of door.

As may be seen, this is an extremely important function of the Building Department, as invariably in emergencies a state of panic or semi-panic occurs, and where persons gathered within are unaccustomed to the location of emergency egresses, they, in their haste to gain access to the exterior, usually attempt to leave a place of assembly by the way in which they entered, thus forming congested areas at a location normally considered the main entrance. To teach people to use emergency exits presents a difficult problem unless the occupants to be served by such emergency exits are persons who are accustomed to being in the same building or location in buildings day after day. For this reason I believe it necessary that all plant engineers or managers should arrange to conduct drills that will permit, by prearrangement, certain numbers of employees to utilize respective exits available, much in the same manner as exit drills are conducted in public schools. In this way, panic and congestion at a commonly used entrance may be avoided in an emergency.

As you may know, the Massachusetts Committee on Public Safety, as well as the City of Boston Committee on Public Safety, have conducted schools in which the subject of egress has been incorporated in the course, so that there are available for your assistance here in Massachusetts many persons qualified to assist you with your egress problems, and these committees on public safety are only too willing to assist in every way possible.

The entire personnel of the Plan, Engineering and Construction Divisions of the Building Department are closely associated with the Civilian Defense program, and as municipal officers they function as part of same. Normally, their duties as engineers and building inspectors are such that they are conversant with modern construction and engineering practices and the theories in the science of design and soil mechanics, as well as the manufacture of new materials and the new methods of construction, and their services are and should be made available to you in the solution of your problems. The tempo at which all manufactur-

ing plants are now operating does not permit of delay in solving the problems that arise, and there is no doubt in my mind that you gentlemen, on many occasions, have been confronted with the problem of whether or not an existing structure is suitably designed to accommodate new loads for added machinery, storage of materials, and such, and probably you are unaware of the fact that in your local defense organization there are men capable of passing judgment on such problems when they are closely related to Civilian Defense. Naturally, the engineers or inspectors of the Building Department would not usurp the business of the professional structural engineer, and it is not the intention of the Civilian Defense organization that they do so. However, there may be many instances where you would not know whether or not a particular floor might be properly designed to accommodate a concentration of employees as a shelter area in an air raid. This question could be answered by the type of man of which I speak.

Little do the occupants of any building realize the importance of the work of their municipal building department. The houses in which they live, the offices, factories, buildings of industrial plants and stores in which they work, the theatres, moving picture houses, halls and places of public assemblies in which they spend their hours of recreation, schools and hospitals, the churches in which they worship, are all structures the design and construction of which have been carefully checked and supervised by Building Department engineers.

Almost daily, for what is now a period of months, engineers of the Plan and Construction Divisions of the Building Department have been consulted by property owners and managers for advice relative to the establishing of shelter areas within buildings — the necessity of evacuation of building in an emergency — erection of and type of barricades necessary to protect persons, properties and valuables, also to prevent shattered glass from flying — how to most economically blackout a building — how to install raid notification systems — also to assist in A. R. P. organization and inform persons as to proper conduct in an emergency.

Likewise available in an advisory capacity, from the personnel of the plumbing, gasfitting, elevator and fire

protection divisions, are men who by education and practical experience are capable of assisting you in the solution of problems relating to their particular division as they might relate to the Civilian Defense program. When and what to do correctly in an emergency is what we are attempting to definitely decide upon, and it seems to me that those persons who have had actual experience in emergencies, closely approaching those that we are contemplating as the outcome of enemy action, are the men who have been called upon during periods of flood, hurricane, building collapse, etc., to assist you. Such men are the ones I say should be available in your local building departments.

As previously stated, the entire personnel of the Building Department devote their occupational time to non-manual engineering and inspection work of a supervisory character. However, so that the Building Department could function in an emergency and perform manual work required of demolition and rescue squads, this department has, in Boston, recruited the services of some three thousand volunteers, mostly from the ranks of the building trades union. Actually there are now organized, and ready to act in an emergency, twenty rescue units composed of sixteen men each, twelve wrecking units composed of sixteen men each, twelve shoring units composed of fourteen men each, six construction units composed of twenty-seven men each, twelve protective units composed of fourteen men each, twelve rigging units composed of eight men each, ten roof sign units composed of nine men each, twelve plumbing units composed of four men each, twelve gasfitting units composed of four men each, twelve steamfitting units composed of four men each, as well as twelve elevator construction units composed of five men each and twelve electrical units composed of four men each.

As the names of the units imply, with the exception of rescue, shoring and construction units, the personnel of the respective units are licensed plumbers or electricians, sign erectors, steamfitters, gasfitters, etc., whereas the personnel of the construction units are carpenters and masons, and the personnel of the shoring and wrecking units are licensed wreckers and shorers, building movers and carpenters accustomed to heavy timber construction work.

Each unit has a specific function and is assigned to a base station at a strategic location within the city where equipment, either city owned or assigned by contractors, is available for their use. The Civilian Defense organization is so established that the volunteers mentioned are summonsed to their posts by audible alarm signals, messenger or telephone, and they will respond to the scenes of incidents as directed by the regularly employed members of the permanent divisions of the Building Department who have been on twenty-four hour a day duty since the incorporation of the Building Department in Civilian Defense organization.

On many occasions I have been asked why I have accepted, as volunteers in the work units heretofore mentioned, only the services of skilled craftsmen of the building industry, and in the administrative and supervisory group only the services of architects, engineers and persons trained in the technique of building construction.

Gentlemen, I will tell you why.

Innumerable persons in many walks of life fail to realize or visualize the terrific amount of damage there would be to buildings in the event we were bombed, and most persons of any community would, I believe, consider their municipal fire departments to be the most potent factor in Civilian Defense, but I can readily conceive of conditions which would limit and tax to capacity the facilities of a fire department.

Presume that, due to the dropping of incendiary and explosive bombs from enemy planes, one hundred and fifty fires are started simultaneously, and fifty to one hundred buildings are destroyed, gas and water mains are blown out, and such destruction has caused many streets to become impassable to traffic. What then is the fire department going to do? Obviously they are going to concentrate on the extinguishing of fire to prevent its spread and their entire facilities and man power would be so occupied. But as important as the quenching of fire is the saving of human life — particularly the lives of persons trapped in partially demolished buildings and underground structures requiring the services of demolition and rescue crews, as important a unit as there is in the Civilian Defense organization.

Training of the character necessary to cope with the situation caused by bombing of buildings and structures can be gained only by actual experience, as each par-

ticular building or structure that is bombed will present a specific problem as it relates to emergency work necessary to permit the rescue of persons confined and trapped therein.

Skeleton steel structures will prove more indestructible than wood and masonry buildings, and wood and masonry buildings less destructible than wood frame buildings. However, in no instance can the manner, extent and results of destruction or demolition be predetermined, as collapse of a structure from internal combustion will vary from that caused by external combustion or concussion, and the disarrangement and dislodgement of structural materials of floors and walls, together with that of mechanical equipment and debris, will likewise vary.

To destroy buildings for the mere purpose of training rescue and demolition crews is ridiculous, so therefore is it not logical to expect such crews to be organized among persons trained to design, assemble and build structures.

Within the past week the newspapers have carried accounts to the effect that eight thousand (8,000) pound bombs have been dropped on German cities, and that as large an area as one square mile has been devastated by the explosive properties of one bomb. Now, if you can imagine such bombings here, you can appreciate the tremendous destruction to buildings and structures, and readily realize the importance of demolition, so for a few minutes I will speak on the subject of demolition.

Demolition, the act or process of reducing a structure or building to ruin, appears to many persons to be a relatively simple work operation, but do not fail to appreciate that the problem of safely razing a building involves many of the most practical principles of engineering, and the work itself is of a most hazardous nature.

Relatively few persons devote their full occupational time to the work of demolition, as can be substantiated by the fact that there are only sixty-five (65) persons licensed to perform such work in the City of Boston, whereas two thousand, three hundred and seventy-three (2,373) are licensed to supervise the work of constructing buildings.

Unusual conditions will be encountered in our demolished or partially demolished buildings, and some of those I can visualize are the following:

1. The undetermined and unapparent deterioration of structural value of materials resulting from the heat of fire — introduction of eccentric and redundant forces through blast, distortion, upheaval and impact — deposit of uncalculated loads caused by debris.

2. Disposition of building occupants' personal stock and properties.

3. Danger to workmen — the unperceivable dislodgement of adhesive, cohesive, and bonding properties of materials caused by non-predeterminable and incalculable forces normally non-existent in structures.

4. Termination of services — ammonia refrigeration feed lines — high pressure steam supplies — illuminating gas lines — water supplies — electric feed cables and live wires — sewage contamination.

5. The possibility of invisible toxic gases lurking within the structure — close to damp and wet areas — and their effects on persons.

6. Limited and restricted working areas — physical condition of services in adjoining streets, and the possibility of streets being open-cut, thereby preventing the trucking of materials from the site.

7. Re-establishment of vital services such as water, sanitary drainage and ventilation — electricity and gas — to permit functioning of habitable portions of partially demolished buildings.

8. Emergency equipment, rigging and tools required to permit rescue of entrapped persons.

9. Protection of public by installation of brows and aprons.

10. Organization — competency of volunteer workmen — supervision of personnel.

11. Inadequacy of party walls to support adjoining buildings after lateral support has been removed — necessity of and type of shoring required.

12. Extremely important necessity of storage space for materials — salvaging of same.

13. Inquisitive public — necessity of posting guards or watchmen — fencing of area upon completion of demolition operations.

14. The unmethodical procedure of emergency action as compared with the methodical procedure of normal times.

15. Structurally sound unoccupied buildings open to trespass, presenting to the fire saboteur an invitation to ply his insidious commissions.

These and many more questions may confront us and the mere mention of them does not provide a remedy,

therefore I will endeavor briefly to establish a practical, workable program of procedure covering the highlights of the preceding problems.

COMPETENCY OF WORKMEN.

Utilization of the most capable engineering knowledge and talents, as related to actual work procedure, is worthless unless competent workmen are employed to perform manually the tasks assigned. We cannot permit persons unacquainted with building construction to operate in our work crews as their actions may be instrumental in causing a building collapse and their presence may jeopardize the safety of others; therefore I believe, as previously stated, that the services of building tradesmen only should be considered.

Demolition work units must be well equipped, supervised and directed, and must be available for emergency work.

DISPOSITION OF BUILDING OCCUPANTS' STOCK AND PROPERTIES.

Let us for a few moments consider the difficult situation imposed upon us in this problem. Normally buildings are vacant when turned over to the wrecker but war emergency conditions may be such that we will have to raze a building which a few short hours before was completely tenanted. Presume that high explosive bombs have penetrated to the sixth floor of a ten-story, steel frame, first-class structure housing many jewelry and optical firms, now engaged in producing essential war equipment, and that the upper floors have been so completely demolished as to be uninhabitable. However, there has been no fire, so the Fire Department, if it had responded to the scene of the disaster, has departed. We are in charge and our demolition crews are at work in the building. A rapid, superficial inspection of conditions indicates the structure to be so damaged that ingress of the proprietors of the various establishments must be prohibited as the protection and safety of persons is paramount and must be our first consideration. The occupants, in their desire to acquire for their possession what remains of their valuables, may pry at some dislodged structural member sufficiently to cause entire collapse of all materials above. Now, how are we to

proceed? First, we must contact the police official of highest authority in the particular district and arrange for the transfer of valuables to a place of safety, same to become the charge of the Police Department. Secondly, we must start the work of razing the building in a manner as later described in the solution of other problems heretofore mentioned.

I think that you gentlemen will concur that very little thought has been given to problems in the category just related; however, I am certain you can see the momentousness and scope of just such problems. As you know, many buildings house merchandise and equipment, the value of which is far in excess of the cost of the building, and such contents must be guarded and accounted for.

STORAGE SPACE FOR MATERIALS.

Normal progress of building construction work requires a sequence of material deliveries which can be controlled. This precludes the probability of requiring excessive storage space in the buildable area, but a war emergency demolition project may provide the exact opposite by the deposit of excessive debris loads in the structure and these must be reduced immediately as a safety measure. Therefore we must always be alert to the necessity of providing dumping areas and material storage areas. Basement areas of buildings previously razed provide good dumping grounds and the filling of these areas eliminates a public hazard. Such areas and vacant lots should be catalogued for the availability of authorities. Street congestion must be alleviated and eliminated if possible during wartime emergencies.

Actual photographs and verbal descriptive pictures of the utter ruin caused by bombing give us some appreciation of the problems that may confront us, but no photograph can show us how we can dispose of the tons and tons of unsalvageable building materials which must be removed from site of bombing, or how we can store the salvageable materials. This presents a tremendous problem. Vast acreage may have to be provided for such storage and such areas must be located in isolated and remote sections so that they themselves, when fully stocked, will not present a war hazard. Vast acreage may sound absurd to you, but, gentlemen, it is not absurd as has already been proved in Boston.

During the past three years modern Federal Government Housing Projects have supplanted thousands of sub-standard dwelling units and these dwellings were obliterated by action of building wreckers who utilized acre after acre of vacant land for the purpose of sorting, salvaging and storing of building materials.

Proper locations for the storage of salvaged lumber is itself a perplexing problem, particularly if stored within city limits. I am certain I would not want to be responsible or held accountable for the storage of quantities of incendiary bomb food in the nature of highly inflammable bundles of wood lath and such, which material by its combustion might ignite occupied areas.

We must find the proper isolated storage areas and if these are not available and we are obliged to use vacant areas adjoining or within occupied areas then it is our obligation to provide proper protection from fire, sabotage and pilfering by installation of fire lines, posting of guards, and other safeguards. The transportation of materials to storage areas may also create a serious trucking problem, as I am informed that trucks are available only at a premium.

PROTECTION OF PUBLIC.

Mr. General Public is and always has been an inquisitive person, wont to appear in "No Trespass" posted areas, and for his own protection we must provide guards and watchmen to prohibit his entrance on the site. Also we must protect Mr. Pedestrian from injury by falling materials by the erection of brows and aprons, or a series of same, as required. Sidewalk thoroughfares must be bridged and housed and heavy planked roofing erected. Hose lines must be made available for wetting down materials as dust blown by wind may cause eye injury to many persons. In addition, it may be found necessary to enclose openings with tarpaulins to prevent spread of dust.

THE UNMETHODICAL PROCEDURE OF EMERGENCY ACTION AS COMPARED WITH THE METHODICAL PROCEDURE OF NORMAL TIMES.

Normally the building wrecker proceeds in a pre-determined manner to strip a building of all materials which have no structural value. Trim, lath and plaster, fireproofing and masonry veneer are removed, thereby

eliminating weight and exposing concealed connections, bearings, bracings, etc. The wrecker then proceeds to undo that which the constructor took such great pride in doing. This is normal methodical procedure. Now for unmethodical procedure. Presented to the wrecker is the gaping, grotesque and distorted structure, one which, by its distortion and internal disruption, etc., defies all principles of engineering theories by the fact that it is partially still intact.

How do we approach this problem? It can easily be seen that methodical procedure as briefly described cannot be followed, as an entirely different problem is presented. We now must use our best engineering knowledge and make a very exacting inspection and decision. Have the foundations been disturbed by forces caused by blast, or weakened by flooding due to breaking of high pressure water main in the street? Have those columns concealed by fireproofing been fractured where cracks appear? Is that column now so eccentrically loaded that we dare not disturb a contributory supporting member?

Obviously forces and stresses foreign to the normal structure have caused the damage we see and the capacity of the remaining structure to absorb loads which we will impose on it in our razing operations is what we must determine.

Cautiously we tie off exposed structural members which when burned through by acetylene torch may fall to floors below, using great care to distribute properly the resulting impact load by the use of snub lines. Knowing now that by lashings and cable ties our building has been reasonably secured we continue our investigations and examination of the structure. This crippled building cannot be left standing sufficiently long enough for us to discuss theoretical opinions, so we institute the practical method of hammer sounding the materials for lack of bond and cohesion and we satisfy ourselves that bonds have been broken and further collapse of unbonded materials is inevitable. Our floors cannot withstand additional debris loads, so we must invoke the unmethodical procedure of rebuilding or resupporting from the footings and foundation up by means of shoring and cribbing a building which normally we would raze from the top down without such aids.

Masonry of all kinds is usually erected individually, piece by piece, but seldom is it razed in such manner. Its assembled bulk and weight must not be permitted to be such that it will overtax the capacity of our razing equipment. Heavy coping and cornice stones, dislodged by explosion, will be found very difficult to handle. The Lewis holes provided for handling and construction purposes will not be available and slings must be used. Cast stone veneers will be found difficult to handle also, but we will find that our old friend, the common brick, will give us the least concern in demolition work as it does in construction work.

UNOCCUPIED BUILDINGS OPEN TO TRESPASS.

Over the years public safety officials have been confronted with the problem of vacant buildings open to trespass, those that present fire hazards, moral and health nuisances, and the like. Now, more than ever, they should be of greater concern to us and to military authorities. Certainly they present to the saboteur the maximum of concealment where detection would be difficult.

Buildings of this character often are located in such close proximity to successfully operating business establishments that they could very definitely be the means or instrument by which the saboteur could accomplish their destruction. Civilian Defense and your own protection warrant the demolition of such structures, and as the constituted authority to raze unsafe, dangerous and dilapidated buildings is the building commissioner or inspector you should solicit his aid. Make a survey of the neighborhood in which your plant is located, and if you find unused, vacant buildings nearby report them to your local civilian defense organization.

As can be seen from what has been previously said the work occasioned by demolition is so distinctly different from that of our normal pursuits that I must have in my Civilian Defense organization qualified workmen, and to this extent I describe the functions of the various work units.

I particularly wish to call to your attention, in describing the functions of the various work units, that in each instance the work of the unit will be devoted

entirely to emergency work as it pertains to public protection and rescue work. It is not the intention of the Civilian Defense authorities or municipal officers to usurp the work of private contractors.

Rescue Units.

It is the function of a Rescue Unit to respond to scene of an incident where persons are reported trapped in a building or where a building is partially destroyed by bomb, explosion or otherwise, and there is the possibility of persons being trapped therein.

The work performed by the Rescue Unit would be the removal of any structural or mechanical materials causing the trapping of persons so that actual rescue of the persons could be performed by Fire Department or other rescue agencies.

Wrecking Units.

The work of the wrecking units will consist of razing partially destroyed buildings or structures to avoid total collapse.

Shoring Units.

Shoring units will follow up the work of rescue units and perform the work of shoring and securing buildings not sufficiently damaged to cause same to be razed, thereby permitting reoccupancy of certain portions of same.

Construction Units.

Construction units normally would not operate as emergency units as pertains to the destruction of buildings, structures, etc., and would not be despatched to the scene of an incident. However, they might possibly be pressed into service directly after bombing incidents, particularly if evacuation of persons from the scene of an incident were necessary, their work being to construct barrack type buildings of metal or wood expeditiously to provide reasonably habitable temporary structures, or said units could be used to install temporary bunks in public halls, clubs, etc.

Protective Units.

That pillaging, ransacking and vandalism might be reduced, and possibly avoided, it would be necessary

to have available work units and materials to close up hastily all windows and door openings which would be blown out by explosions.

Rigging Units.

Special units composed of experienced riggers really form an indispensable unit whose services could be employed very effectively in rescue work in preparing slings, slip ropes and other emergency apparatus for lowering injured people to the street from elevated portions of a building, as well as performing the work of erecting temporary lifting apparatus to permit rescue work and enable other units herein classified to perform their work without delay.

Roof Sign Units.

As the erection and dismantling of all exterior signs is separate and apart from building construction and requires employment of licensed sign hangers, it is feasible to organize special units of men to perform the work of securing, dismantling or removing signs or parts thereof destroyed by enemy action, and such units would be despatched to the scene of an incident when it is presumed that their services would be required, they to work independently of the other units herein classified.

Plumbing Units.

It is quite conceivable that sanitary systems incorporated in buildings may be partially destroyed, requiring emergency work of plumbers to be performed to permit continued occupancy of the buildings. Therefore these special units would perform emergency work only of such character as to temporarily permit of the functioning of a system.

Gas Fitting Units.

It is believed that by explosion or otherwise many buildings, into which illuminating gas piping systems have been incorporated, might be so wrecked as to break joints in the piping system, or if hit by bomb might have pipes punctured or perforated, resulting in leaks, which would necessitate repair or correction as an emergency measure before the re-entrance of illuminating gas into the system.

As illuminating gas is one of the most dangerous commodities in daily use we must assure ourselves of the competency of persons permitted to work on the systems, so for this reason we have accepted the applications of licensed gas fitters only in our civilian defense units.

Steam Fitting Units.

Boilers and their appurtenances supplying heat or energy are very susceptible to damage by bombing, wrecking of structure through concussion, and other causes, and for this reason live steam would form a very dangerous element to contend with and would require immediate action on the part of members comprising special steam fitting units. Therefore the members of the units would respond to the scenes of incidents to do emergency work in shutting off steam and oil, and in effecting other corrective measures in the heating systems.

Elevator Construction Units.

Elevator construction in all its phases is highly technical and requires the services of trained licensed craftsmen, and therefore it is logical to assume that other tradesmen would not be permitted in any way to attempt to move elevator cars or equipment damaged by enemy action. These special units would respond to the scene of an incident to perform any emergency work necessary in connection with elevator installations and construction.

Electrical Units.

Light and power wiring providing conveyance of the absolutely essential and necessary commodity — electricity — may be so affected by enemy action as to cause interruption of service. Immediate emergency repairs for restoring service, the killing of wires, etc., would have to be made and the members of units would respond to the scenes of incidents to effect war emergency repairs.

I am reasonably certain there are some persons in this audience who have no realization at all that such organizations as I have described exist within the Civilian Defense Corps; however, I can readily see

how they would be of assistance to you in an emergency and therefore I believe it to be your obligation to call for their assistance if necessary.

PUBLIC UTILITIES.

Cooperating and closely allied with the state and city Civilian Defense Public Safety Committee, and represented in practically each phase of the Civilian Defense program, are such public utilities and communication companies as those previously named — telephone, telegraph, railroad, illuminating gas, electric light and power, etc.

Let us think how dependent we are on these companies and their service for the progress and efficiency of our business.

Perhaps I can best demonstrate the manner in which an electric utility is cooperating, both in civilian defense and in war production, by examining the Boston Edison Company, which is the largest electric utility in New England, serving practically all of Metropolitan Boston.

Months and even years before Pearl Harbor the responsible officials of Boston Edison Company had anticipated some of the demands of war conditions. As long ago as 1938 the company began to enlarge its capacity, anticipating that the troubled conditions around the world would stimulate the armament industry in this country. When the second World War actually began in 1939, this plant expansion was accelerated and a new power station is now rapidly nearing completion on the Mystic river. Also in the days before Pearl Harbor the engineers and sales forces of Boston Edison Company were busy almost every day supplying additional electricity to the many defense plants which were springing up in the territory. The company even organized a group which advised many small manufacturing plants in changing from civilian to war production.

But the story becomes really dramatic when the bombs actually dropped on Pearl Harbor on that fateful Sunday afternoon. Within an hour after the first radio bulletin, every key point in this big public utility system was under heavy guard and this has continued night and day ever since.

Most public utility systems maintain at all times emergency organizations. They must anticipate interruptions of service due to cable failures, wind storms,

sleet storms, and things of that nature. But it was apparent to the management of Boston Edison Company that the emergency organization of peacetime might not be adequate for the many problems of actual wartime. Early on the morning of December 8, the president of Edison created a wartime emergency organization. He named one vice president as Emergency Administrator and another as Chief Coordinator of all war time activities. Within a day or two a new organization had been superimposed on the company's regular operating organization. Eight of the company's principal executives were named Coordinators of such functions as Air Raid Protection, Communications, Finance and Records, Personnel, Public Relations, Reports and Regulations, Restoration and Planning, Supplies and Transportation.

A director was appointed to take care of each of the following special wartime functions.

Blackout Procedure, Distribution Restoration, Education, First Aid and Medical, Gas Protection, General Property Protection, Generating Restoration, Line and Manhole Protection, Mobile Squads, Operations Training, Radio Communications, Repairs and Demolition, Salvage of Materials, Station Protection, Telephone Communications, Transportation.

Liaison officers were appointed, in addition, to keep in touch with all public agencies having to do with the war, such as: Adjutant-General's Office, Boston Committee on Public Safety, Boston Police, F. B. I., Press and Radio, Massachusetts Committee on Public Safety, Red Cross and Social Agencies, State Police, U. S. Army and U. S. Navy.

The net result of this organization was that the 30 or 35 leading executives in the Edison system each had an individual responsibility for one or more functions, and to avoid duplication and confusion all reports cleared through the Chief Coordinator and the Emergency Administrator. Schools were set up within the company and have continued ever since, until today practically all of the 3,000 employees have been instructed in special functions which would be of tremendous value in the event of such an emergency as an actual air bombardment of Metropolitan Boston.

The principal executives of the company hold regular meetings at which problems occasioned by the war are

thoroughly discussed and company policies are shaped to meet them. Normal business activities have been entirely subordinated to meet every request of military and other public authorities in assisting the war effort.

In common with other industries, the electric utilities have had to change their methods of operation because of the shortages of vital materials. Ordinary extensions of service are out for the duration, and priorities are sought only where the proposed extension is vital to war activity. The company's power sales force has been transformed into an advisory service for war production plants to keep abreast of growing needs for electricity in the production of armament, etc.

I have gone into details on the methods employed by the Boston Edison Company, because it happens to be the electric utility with which I am most familiar, as it serves my own city. But I have also had in my official position a great many contacts with other electric utilities, and I know that they are proceeding along similar lines. We are in an electric age, and without the great quantities of electricity which are being turned out every day at steam plants and at water power plants industry could not continue. From my personal observation, I am confident that if we should have a major calamity in this region, which God forbid, the electric companies are prepared to meet it in a highly efficient manner.

Again I speak of the hurricane of 1938, which was perhaps a more severe blow to electric service than anything which a single air raid could accomplish. And we recall the manner in which the electric utilities met that emergency.

Likewise consider the telephone, an instrument acknowledged as being indispensable, which provides the basic medium of all communication for civilian and military. We accept its availability and use as commonplace and seldom do we give thought to the fact that somewhere — all the time — some one is in constant attendance to keep the system in operation for our convenience. The telephone companies know of the importance of continuous and uninterrupted service and they are equipped and prepared to cope with any emergency that might arise. In the same way as electric, gas and power companies, their lessons have been learned the hard way by actual experience in floods, hurricanes, earthquakes, blizzards and sleet

storms, underground gas and sewer explosions, water breaks, etc. Little wonder is it that they have organized emergency crews and predetermined plans for alternate and secondary routes.

Generally speaking, telephone service can be considered to be in three categories:

First, the outside toll plant handling long distance and out-of-town communications.

Second, the central office housing equipment; and

Third, the local outside plant.

As stated before, those companies have perfected alternate plans for service, all of which are confidential, for the express purpose of coping with war emergencies such as disruption of service by bombing, sabotage, or other enemy action. What is meant by these confidential plans might be further explained by giving an example. For a moment let us consider the trunk line between Boston, Massachusetts, Portland, Maine, and beyond. This particular line, servicing many industrial plants and government organizations such as Portsmouth Navy Yard, various forts along the coast, shipyards in Portland, Bath Iron Works, and such, is located parallel with the main vehicle artery to Portland, namely, the Newburyport Turnpike. Its close proximity to the coast will probably make it more subject to danger than some of the other lines that could be used as an example. Having in mind the vulnerability of this particular line, the company is now installing an alternate cable further inland as a safety measure. However, at this moment the network of overhead and underground telephone communication service is so arranged that if the trunk line mentioned was damaged to such an extent as to preclude the possibility of correcting the breaks within a short period of time, messages could be rerouted through existing lines and offices so that without any noticeable delay a particular office such as Portland, Maine, could be reached from Boston by the secondary route or by the way of the back door, so to speak.

As we all know, the central offices of any telephone company are the nerve centers of the system where most of the equipment is housed. The destruction of a central office by bombing would, no doubt, create a very serious problem for the company, but through

foresight such an occurrence has been visualized, and locations, which would serve as alternates for disrupted primary services, at least until temporary restoration of service by emergency repair crews, have been designated.

That the telephone company has considered the interruption of service by enemy action is well explained by the fact that they are in agreement with the military and civilian defense authorities as to whom service, either permanent or temporary, will be restored if a break does come. As you undoubtedly presume, the armed forces would be the first to have their service restored and in connection with the armed service would be the private phones of high ranking army and navy officials; second would be the service to civilian defense organizations and offices and personnel in the importance of their duties; third, institutions, municipal, police and fire departments, hospitals, and likewise the persons connected with such organizations, as doctors and nurses, whose services would be in demand; fourth, war industries as it relates to their importance.

Although the telephone companies will at all times make every effort to keep all services in operation, those just mentioned would be the first to have service restored, and while there are no alternate planned services for the individual subscriber for home use they can be assured that they would not be without telephonic communication for any considerable period of time, even if it were found necessary to string wires from tree to tree, as was done at the time of the hurricane.

As you know, most of the personnel of the field and technical groups of a telephone company are specialists in their respective vocations, and they are privileged to use the finest of equipment and apparatus for their work. Their rolling stock, comprising four hundred and twelve motor vehicles in Metropolitan Boston, manned by eighteen hundred men in heavy construction, cable, repair and line crews, commands attention. They are there to assist you, either as a subscriber or through the agency of your local civilian defense committee if a war emergency arises.

ILLUMINATING GAS.

Illuminating gas, now seldom used for the purpose of illumination, but used in huge quantities as fuel for

heat and power, is a commodity which cannot be dispensed in the same manner as electricity. Its conveyance from source of manufacture to place of storage or consumer must be a pipe line, invariably installed below grade, and so arranged, assembled and protected as to preclude the possibility of leaks and common damage.

Experts must be employed by gas companies to install its services, as the explosive qualities of gas are such that the average individual is not qualified to handle it, hence the necessity for the statute laws governing its installation. As this fact is recognized by the gas companies they have encumbered themselves with the necessary work of organizing their own employees into what appears to me to be the personification of efficiency in Civilian Defense Corps work.

Officials of the Boston Consolidated Gas Company and its associated companies in Greater Boston know that an aerial bombardment attack on a city will damage the mains of their system and they know also that they, and they alone, can effect repairs. No other agency is equipped to perform their work and at best could only lend assistance. Hence the necessity for the splendid organization they have established in Metropolitan Boston.

Their organization is very similar to that previously described as related to the Edison Company, particularly the administrative divisions. Most of the company employees have attended A. R. P. schools, as well as the schools instituted within their own company. Their established emergency procedure for mobilization of men and equipment is so thoroughly worked out, understandable and practical, that only slight delay in action, in an emergency, is contemplated.

Predicated on the use of a two-way radio system, energized by Edison Electric Company power, or in the event of break-down in the public utility company's service by auxiliary portable generators, a series of stations, stationary and mobile, have been established, providing not only continuous and uninterrupted inter-departmental communication service but complete coverage throughout the entire metropolitan area, by the agency of radio equipped passenger automobiles and special service trucks.

Movement of rolling stock composed of such vehicles as drip, governor, hoist and panel trucks, vans, trailers, and compressors carrying leak kits, miscellaneous, large, heavy and extra heavy gate keys and other emergency field tools and equipment, is controlled from a centrally located, radio equipped service station headquarters. Said headquarters is, in turn, connected with twenty-three outlying sub-stations housing some of the two hundred and fifteen or more vehicles of the type mentioned above, making, in effect, a mesh system of area coverage which can be alerted almost instantly. The equipment described, the headquarters, outlying offices and sub-stations, are manned by approximately eight hundred persons, each and every one of whom has a definite prearranged assignment location and duty to perform, regardless of the time of day or night they might be called upon. They know where and when to go into action, are properly identified, trained and equipped, and they await only the occasion of an actual emergency to demonstrate their efficiency.

Gentlemen, I have described for you the organizations and functions of important municipal public works and building department divisions, and also public utilities, as they are related to the Civilian Defense Corps. Each division and company is represented in the report centres and the coordination of activities or liaison is such that they will be available at all times. Please call upon them as necessary.

Thank you.

